Wounds digest

In this section, a brief synopsis is presented of a range of recently published articles that may be of interest to healthcare professionals working in the wound care setting. The aim of this round-up is to provide an overview, rather than a detailed summary and critique, of the research papers selected. Full references are provided should you wish to look at any of the papers in more detail.

1 Reversibly immortalized keratinocytes (iKera) facilitate re-epithelization and skin wound healing: Potential applications in cell-based skin tissue engineering

Readability	✓	✓	✓	✓	
Relevance to daily practice	✓	✓	✓	✓	
Novelty factor	✓	✓	✓	✓	

- A failure in the healing process can ultimately lead to chronic non-healing wounds or abnormal scar formation. It is tissue granulation and re-epithelialisation that results from a multi-phase wound healing process that repairs skin injury.
- The effective management of large chronic skin wounds remains a challenge to clinicians all over the world, despite the fact that significant progress has been made in developing novel scaffolds and/or cell-based therapeutic strategies to promote wound healing over recent times.
- Armed with the understanding that keratinocytes are key to re-epithelialisation and wound healing, the authors investigated whether or not exogenous keratinocytes, in conjunction with a citrate-based scaffold, enhanced skin wound healing.
- The authors conducted a proof-of-principle experiment, in which was demonstrated that immortalised mouse keratinocytes (iKera) cells embedded in citrate-based scaffold PPCN provided more effective re-epithelialisation and cutaneous wound healing when compared to either PPCN or iKera cells alone, in a mouse skin wound model.
- In conclusion, these results demonstrate that iKera cells may operate as an important skin epithelial source, in combination with appropriate biocompatible scaffolds, to instigate cutaneous wound healing and skin regeneration.

Zhong J, Wang H, Yang K et al (2021) Reversibly immortalized keratinocytes (iKera) facilitate re-epithelization and skin wound healing: Potential applications in cell-based skin tissue engineering. *Bioact Mater* 9: 523–40

2 Health-related quality of life and chronic wound characteristics among patients with chronic wounds treated in primary care: a cross-sectional study in Singapore

Readability	✓	✓	✓	✓	
Relevance to daily practice	✓	✓	✓	✓	✓
Novelty factor	✓	✓	✓		

- Gaining an understanding of how chronic wounds impact a patient's health-related quality of life (HRQoL) is an important element for healthcare service delivery and effective treatment management.
- The authors assessed HRQoL among 233 patients in six primary care clinics in Singapore suffering from chronic wounds and examined associations with patients' socio-demographics and wound characteristics. These patients responded to a survey and their answers were assessed using the EQ-5D-5L instrument.
- Data were then analysed by descriptive statistics and generalised linear models. Arterial ulcers were found to have the greatest negative impact on HRQoL, relating to mobility, self-care, pain/discomfort and anxiety/depression, and these also had the lowest VAS mean score 62.31 (SD: 28.3; range: 0–100), which indicates the worst health.
- HRQoL related to mobility was significantly associated with age, non-Chinese ethnicity, mixed ulcers, wounds with low to moderate exudate level, atypical hard-to-heal wounds and a wound duration ≥6 months.
- Chronic wounds commonly decrease patients' quality of life and the conclusion of this study can be used to improve healthcare delivery for patients living with chronic wounds, in order to optimise their HRQoL.

Zhu X, Olsson MM, Bajpai R et al (2021) Health-related quality of life and chronic wound characteristics among patients with chronic wounds treated in primary care: A cross-sectional study in Singapore. *Int Wound J* doi: 10.1111/iwj.13708. [Online ahead of print]

3 Wound coverage by the linen dressing accelerates ulcer healing

Readability	✓	✓	✓	✓	
Relevance to daily practice	✓	✓	✓	✓	
Novelty factor	✓	✓	✓	✓	

- Chronic ulcers are a leading cause of morbidity and mortality, with their incidence expected to increase in the future given that people now live longer. The key elements of healing, namely: wound cleansing, bacterial balance, exudate management and local tissue in a wound environment. It was these crucial elements that led to the development of an interactive dressing, which was based entirely on plant (flax) raw materials — seedcakes, oil, fiber.
- The authors tested the content of bioactive compounds (qualitatively and quantitatively) using chromatographic techniques, as well as their biological activity during tests on fibroblast cell cultures (NHDF).
- All of constituents of the linen dressing are natural, originating from two types of the engineered flax plant. They have been designed to control the microenvironment, combining with exudate using hydrophilic fibre and controlling the flow of exudate from the wound to the dressing. Additionally, pre-clinical data showed a reasonable reduction in wound size in patients with chronic leg

ulcers that were treated with a linen dressing.

- This study represented a first in terms of assessing an application of an innovative interactive linen dressing used in the treatment of chronic wounds.

Skórkowska-Telichowska K, Mierziak-Darecka J, Wrobel-Kwiatkowska M et al (2021) Wound coverage by the linen dressing accelerates ulcer healing. *Postepy Dermatol Alergol* 38(5): 827-41

4 An interprofessional approach to preventing tracheostomy-related pressure injuries

Readability	✓	✓	✓		
Relevance to daily practice	✓	✓	✓		
Novelty factor	✓	✓	✓		

- The tracheostomy steering committee (TSC) — an interprofessional team — was launched to help prevent tracheotomy-related pressure injuries (TRPIs), as well as standardise tracheostomy insertion and patient care for those with tracheostomies.
- The DMAIC (Define, Measure, Analyze, Improve and Control) framework was used to assess a patient population that included all adult patients requiring a tracheostomy during their inpatient hospital stay from January 2018 through December 2019. This encompassed a total of 289 patients.
- A reduction in the daily rate of TRPIs by 50% was seen with the use of the standardised TRPI-prevention bundle. The bundle included recommendations for protective foam dressing and skin barrier film, suture tension, timing of suture removal, offloading and positioning, stoma care, escalation, documentation and dual skin assessment. Patients were tracked with an electronic tracheostomy.
- A significant reduction in the incidence of TRPI was reported through using the TRPI-prevention bundle at the authors' institution. An interprofessional team is needed to provide optimal tracheostomy care to ensure the best outcomes.

Urquhart AE, Savage E, Danziger K et al (2021) An interprofessional approach to preventing tracheostomy-related pressure injuries. *Adv Skin Wound Care* doi: 10.1097/01. [Online ahead of print]

5 High resolution ultrasound in subclinical diabetic neuropathy: a potential screening tool

Readability	✓	✓	✓	✓	
Relevance to daily practice	✓	✓	✓		
Novelty factor	✓	✓	✓	✓	

- The authors aimed to assess the appropriateness of high-resolution sonography in screening people with diabetes for subclinical neuropathy.
- Seventy adult patients with type 2 diabetes mellitus and 30 controls were assessed. The size (cross-sectional area), shape, echogenicity and morphology of nerve were assessed and compared between the groups.
- The authors found that mean cross-sectional area of all nerves was significantly higher both in diabetic polyneuropathy and non-diabetic polyneuropathy group compared to controls ($P<0.001$). The highest sensitivity (93%) and specificity (86%) for detecting nerve changes in the non-diabetic polyneuropathy group was found in the common peroneal nerve cross-sectional area of 4.5 mm^2.
- Presence of sonographic nerve changes in asymptomatic people with diabetes depicted that morphological alterations in nerves precede clinical symptoms. High-resolution sonography was found to be accurate in detecting nerve changes and can be used as a potential screening tool for detection of subclinical diabetic polyneuropathy.

Tandon A, Khullar T, Maheshwari S et al (2021) High resolution ultrasound in subclinical diabetic neuropathy: a potential screening tool. *Ultrasound* 29(3):150–61

6 The cross-sectional association of cognition with diabetic peripheral and autonomic neuropathy – The GRADE study

Readability	✓	✓	✓	✓	
Relevance to daily practice	✓	✓	✓	✓	✓
Novelty factor	✓	✓	✓	✓	

- This study set out to address a lack of literature on whether or not measures of cognition are related to the presence of diabetic peripheral neuropathy (DPN) and/or cardiovascular autonomic neuropathy (CAN). A total of 5,047 middle-aged people with type 2 diabetes of <10 years' known duration were included from the Glycemia Reduction Approaches in Diabetes Study (GRADE).
- Verbal learning and memory were assessed with the Spanish English Verbal Learning Test; frontal executive function and processing speed was examined by the Digit Symbol Substitution Test; and ability to concentrate and organise data was tested by word and animal fluency tests. DPN was assessed with the Michigan Neuropathy Screening Instrument, while CAN was examined by indices of heart rate variability.
- In terms of the relationship between DPN and cognitive impairment, it was found that higher waist circumference and urine albumin creatinine (UACR) levels had the strongest correlations.
- DPN was cross-sectionally associated with lower performance in measures of cognition in people with type 2 diabetes of <10 years of known duration, while greater waist circumference and UACR were found to be important variables in this association.

Barzilay JI, Ghosh A, Busui RP et al (2021) The cross-sectional association of cognition with diabetic peripheral and autonomic neuropathy – The GRADE study. *J Diabetes Complications* 35(12):108047